

REMARKS

The present application was filed on July 10, 2003 with claims 1 through 21. Claims 1-21 are presently pending in the above-identified patent application. Claims 10-13 have been withdrawn from consideration in response to a restriction requirement. Applicant acknowledges that while claims 10-13 have been withdrawn from consideration, as noted above, these claims are still pending in the present application. Claims 6 and 16, as proposed herein, have been canceled without prejudice. Applicant herein proposes to amend claims 1, 14 and 21. Support for the amendments can be found, for example, on page 12, lines 24-26 and page 2, lines 21-24. No new matter is being introduced.

In the Office Action, the Examiner rejected claims 1-9 and 14-21 under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. Also, the Examiner rejected claims 1-9 under 35 U.S.C. §102(b) as allegedly being anticipated by Silverman [PNAS; April 24, 2001; volume 98, pages 4996-5001] (hereinafter referred to as "Silverman"). In the Office Action, the Examiner also rejected claims 14-21 under 35 U.S.C. §103(a) as allegedly being unpatentable over Silverman in view of Michaud [USPAT 4,017,721].

The comments of the Examiner in forming the rejections are acknowledged and have been carefully considered.

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Section 101 rejection

In the Office Action, the Examiner rejected claims 1-9 and 14-21 under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. Specifically, the Examiner stated beginning on page 3 of the Office Action that

10 [c]laims 1-9 and 14-21 do not produce a tangible result. A tangible result requires that the claim must set forth a practical application to produce a real-world result.

15 Applicant, as proposed herein, has amended independent claims 1, 14 and 21 to include the tangible result of using the global linear hydrophobic moment to characterize an amphiphilicity of a tertiary protein structure. Applicant submits that this is a "real-

world” result. As pointed on page 1, lines 11-12, of the specification, “three dimensional protein structure is important for all human bodily functions.” Furthermore, on page 2, lines 22-24, of the specification, the “real-world” value and applicability of this result is emphasized:

5 it is desirable to have measurements pertaining to the entire protein structure. These measurements would yield information useful in protein structure classification and functional region determination.

Also, beginning on page 12, line 25, of the specification, it is stated that

10 the global linear hydrophobic moment characterizes the amphiphilicity of the protein. With such a measure, a simple comparison of the hydrophobic imbalance, or amphiphilicity, of different protein structures could be made. For example, two structures with the same fold and close in root mean square deviation (RMSD) might exhibit very
15 different degrees of overall hydrophobic organization. Such differences would be concisely summarized by the global linear hydrophobic moment. The direction of such moment may also assist in identifying regions of functional interest. Further... the global linear hydrophobic moment may be useful in the comparison and classification of overall protein
20 hydrophobic organization. The magnitudes and directions of the global linear hydrophobic moments of interacting proteins can also provide a measure of the hydrophobic imbalance arising from protein to protein interactions.

25 Applicant respectfully asserts that independent claims 1, 14 and 21, as amended, overcome the §101 rejection. Also, Applicant further submits that by virtue of their dependence on allowable independent claims 1 and 14, claims 2-5, 7-8 and 15, 17-20, respectively, are directed to statutory subject matter in their own right.

Thus, Applicant respectfully requests reconsideration and withdrawal of the
30 rejection of claims 1-9 and 14-21 under 35 U.S.C. §101.

Section 102(b) rejection

The Examiner rejected claims 1-9 under 35 U.S.C. 102(b) as allegedly being anticipated by Silverman because the article “describes how to calculate moments of
35 tertiary protein structures.” See Office Action, page 5. Applicant respectfully submits that the Silverman reference does not teach or suggest all of the limitations of amended

independent claim 1, specifically the element of using the global linear hydrophobic moment to characterize an amphiphilicity of a tertiary protein structure.

The Examiner stated on page 6 of the Office Action that “The global linear hydrophobic moment characterizes the amphiphilicity, and the magnitude and direction of the amphiphilicity of the tertiary protein structure.” There is no citation to a specific passage in the Silverman reference to support this statement, and Applicant respectfully submits that no such support exists in the Silverman reference. The only discussion of amphiphilicity appears in column 1 of page 4996, wherein Silverman states that

[t]he hydrophobic moment (2, 3), a first-order moment, has provided a useful measure of the amphiphilicity of α -helical structures. (Emphasis added).

Applicant respectfully submits that the Silverman reference teaches a method involving the determination of a helical hydrophobic moment that provided a measure of the amphiphilicity of a segment of a secondary protein structure, whereas amended independent claim 1 determines the global hydrophobic moment of the entire tertiary protein structure, a measure not previously provided, uses the global linear hydrophobic moment to characterize an amphiphilicity of a tertiary protein structure. Furthermore, as stated on page 2, lines 21-22, of the specification, “While determination of the hydrophobic moments of secondary structures are useful, it is desirable to have measurements pertaining to the entire protein structure.”

Furthermore, on page 12, lines 24-26, of the specification, it is stated that

[d]efining a global linear hydrophobic moment would yield a dual measure comprised of the magnitude and direction of protein amphiphilicity. Thus, the global linear hydrophobic moment characterizes the amphiphilicity of the protein

Consequently, Applicant respectfully submits that the Silverman reference does not teach or suggest the limitation of using the global linear hydrophobic moment to characterize an amphiphilicity of a tertiary protein structure. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Therefore, Applicant respectfully requests withdrawal of the §102(b) rejection.

Applicant further submits that by virtue of their dependence on allowable independent claim 1, claims 2-5 and 7-9 recite patentable subject matter in their own right. As such, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-9 under 35 U.S.C. 102(b) as allegedly being anticipated by Silverman.

Section 103(a) Rejection

The Examiner also rejected claims 14-21 under 35 U.S.C. §103(a) as allegedly being unpatentable over Silverman in view of Michaud. Specifically, the Examiner stated that “Silverman does not teach a computer apparatus or programmable media for performing the claimed analysis,” and that “Michaud... uses a digital analysis system to calculate a centroid of a body.” See page 8 of the Office Action.

Applicant respectfully traverses the Examiner’s rejection on the grounds that the proposed combination of Silverman and Michaud is improper, and even if the combination were proper, all the limitations of the independent claims are not taught or supported by the combination. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). As detailed above, Silverman does not teach or suggest the claim limitation of using the global linear hydrophobic moment to characterize an amphiphilicity of a tertiary protein structure. Therefore, all of the claimed limitations of claims 14 and 21 are not taught or suggested by the prior art, and as a result, Applicant respectfully asserts that amended independent claims 14 and 21 overcome the rejection as allegedly unpatentable over Silverman in view of Michaud.

In addition, Applicant respectfully submits that Michaud does not teach or suggest a system or apparatus for calculating a centroid of residue centroids, as taught in independent claims 14 and 21. Michaud discloses the use of a centroid of the outline of the figure for positioning (see, e.g., Abstract; column 4, lines 29-32). The present invention claims the calculation of “a centroid of the residue centroids.” Page 5, line 5, of the specification. Given the fact that Michaud is directed to an electro-optical system, and the present invention is directed to calculating a global hydrophobic moment of a tertiary protein structure, Michaud cannot be interpreted as teaching or suggesting a

system to calculate a centroid that is equivalent in any respect to that of the present invention.

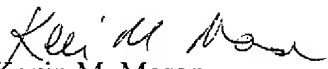
Also, Applicant further submits that by virtue of their dependence on allowable independent claim 14, claims 15 and 17-20 recite patentable subject matter in their own
5 right. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, Applicant respectfully requests withdrawal of the §103(a) rejection.

All of the pending claims, i.e., Claims 1-21, are in condition for allowance and
10 such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

15 The Examiner's attention to this matter is appreciated

Respectfully submitted,


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